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Technical Reports

Quality Implementing Procedure ID: OSTI-LLNL-QIP-SIII.1 Rev.0, Mod.0

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TECHNICAL REPORTS

Quality Implementing Procedure ID: OSTI-LLNL-QIP-SIII.1 Rev. 0, Mod.0 *Effective:* 2/25/05

1. PURPOSE

This Quality Implementing Procedure (QIP) establishes the responsibilities and process for the preparation, approval, and revision of Technical Reports. This procedure describes the process and actions to implement the requirements of the OSTI-LLNL Quality Assurance Plan (QAP) which implements the U.S. Department of Energy (DOE) Office of Civilian Radioactive Waste Management (OCRWM) *Quality Assurance Requirements and Description* (QARD), DOE/RW-0333P. This procedure may also be used for Technical Reports not subject to the requirements of the QARD per the direction of the Project Manager (PM).

2. SCOPE

This QIP applies to individuals within the Office of Science & Technology and International (OSTI)-Lawrence Livermore National Laboratory (LLNL) Project, and other participants who conduct scientific investigation and document the scientific information (such as data, analyses, interpretations or conclusions) in Technical Reports in support of the OSTI-LLNL activities. This QIP is prepared in accordance with OSTI-LLNL-QIP-5.0, *Preparing the Quality Assurance Plan and Quality/Technical Implementing Procedures.*

3. PROCEDURE

3.1 Preparation of Technical Reports

3.1.1 Project Manager (or designee):

A. Control the development, documentation, revision, and change in accordance with the requirements of this procedure. A Principal Investigator (PI) may be assigned to control these functions. Assign a Technical Report Originator (if other than the PI).

B. For technical reports associated with scientific investigation activities, provide the PI and the report originator with a copy of the Technical Work Plan (TWP) in accordance with OSTI-LLNL-QIP-2.2, *Planning for Science Activities.*

3.1.2 Originator:

A. Perform the scientific investigation and document it in the Technical Report in accordance with the applicable TWP and all applicable procedures. Scientific Notebooks may be used in the scientific investigation in accordance with OSTI-LLNL-SIII.0, *Scientific Notebooks.*

B. Obtain a document identifier (DI) for the Technical Report from the Records Coordinator in accordance with OSTI-LLNL-QIP-6.0, *Document Control.* The Document Identifier and revision number should appear on each page of the Technical Report.

C. Document the scientific investigation in the Technical Report using the annotated outline in the Technical Report Outline (Attachment 1).

D. Ensure software used to develop and perform the scientific investigation is controlled and documented in accordance with OSTI-LLNL-QIP-SI.0, *Software Management,* or (if previously developed for the Yucca Mountain Project [YMP]) applicable YMP procedures.

1. Document software used in the scientific investigation as described in Section 3 of the Technical Report Outline (Attachment 1). Document that the use of the software was consistent with the intended use and within the documented validation range of the software.

2. Ensure commercial software used during scientific analysis is controlled and tracked in accordance with OSTI-LLNL-QIP-SI.0.

   Data reductions, spreadsheets, and graphic presentation of data using commercial off-the-shelf software (COTS) programs (e.g., Microsoft Excel) may be used to synthesize, summarize, or graphically present data. The computation shall be documented such that the results can be reproduced and checked by hand. This software use is considered exempt from the requirements of OSTI-LLNL-QIP-SI.0 provided that adequate information is included in the documentation in accordance with the Technical Report Outline (Attachment 1).

3. Software may be used prior to qualification to develop a preliminary output. Document and control the preliminary output in accordance with OSTI-LLNL-QIP-SIII.3, *Submittal and Incorporation of Data to the Technical Data Management System.* The final output shall be produced with baselined software in accordance with OSTI-LLNL-QIP-SI.0. Make a comparison between the preliminary and final outputs. If the outputs are identical, then document the comparison and update the preliminary output with the final output on the Technical Data Information Form (TDIF). If the outputs are not identical, then document the comparison and supersede the preliminary output with a new one containing the final output in accordance with OSTI-LLNL-QIP-SIII.3.

E. Select relevant technical product inputs for developing and supporting the Technical Report information, recommendations, results, and/or conclusions. Document the Technical Report inputs in Section 4 of the technical report. Ensure that the input status (e.g., qualified data, established fact, unqualified data etc.) is clearly listed.

1. Maintain traceability of unqualified data to their status as unqualified when used in the technical report. Combining of unqualified data with qualified data renders the output, calculation, table, etc., unqualified.

2. Document the qualification of OSTI or YMP unqualified data used as direct input, in accordance with OSTI-LLNL-SIII.4, *Qualification of Unqualified Data,* as described in Section 6 of the Technical Report Outline (Attachment 1).

3. Data, obtained from the literature, that are not established facts and are used as direct input must be demonstrated to be suitable for the specific application. When appropriately justified, these data are considered qualified for use within the Technical Report. The following factors should be considered when presenting the case that data are suitable for intended use:

   - Reliability of data source
   - Qualifications of personnel or organizations generating the data
   - Extent to which the data demonstrate the properties of interest
   - Prior uses of the data
   - Availability of corroborating data.

4. Input obtained from an OSTI or YMP product output of a cancelled or superseded document must be demonstrated to be suitable for intended use and justified within the Technical Report. When appropriately justified, these inputs are considered qualified for intended use within the Technical Report.

F. If using a previously validated mathematical model, obtain the appropriate model file/product output from the Technical Data Management System (TDMS).

G. Select references necessary to support the technical basis, recommendations, results, and/or conclusions in the Technical Report. All external references are to include appropriate traceability notations (e.g., Technical Information Center [TIC] catalog numbers) or be identified as readily available. Both external and readily available references can be consulted in the course of the literature review. All references shall include sufficient information to ensure traceability. Where appropriate, references presenting contradictory opinions must be identified and addressed.

H. Prepare the Technical Report in sufficient detail as to purpose, method, assumptions, inputs, references, and units such that a person technically

qualified in the subject can understand the document and verify its adequacy without recourse to the Originator. Present the supporting technical information in a clear and logical fashion. The information must be technically adequate, accurate, and complete. Include page numbers, figure or table numbers, or section numbers in the text citation whenever a specific statement of fact or content contained within a reference is made. Include any additional considerations not previously listed but determined to be relevant to the technical report.

I. Ensure documentation is legible and in a form suitable for reproduction, filing, and retrieval.

J. Complete the appropriate sections of the Technical Report Signature Page/Change History (Attachment 3), in accordance with the instructions.

3.2 Review of Technical Reports

3.2.1 Project Manager (PM)/Deputy Project Manager (DPM) (or designee):

A. Assign a Technical Reviewer, other than the Originator, who has adequate qualifications to have originated the Technical Report. Multiple reviewers may be assigned to review different sections of the report. The review shall be conducted in accordance with OSTI-LLNL-QIP-6.1, *Document Review.*

B. Assign a QA Reviewer, other than the Originator, who has adequate qualifications to perform a quality review of the Technical Report for compliance to applicable procedural requirements and for incorporation of appropriate QA requirements, in accordance with OSTI-LLNL-QIP-6.1.

C. Assign a Checker(s), other than the Originator, to check the technical report. Multiple checkers may be assigned to perform checks for either technical issues or compliance with procedural controls. The technical Checker assigned to check a part of a Technical Report shall have adequate education, training and experience to understand and evaluate the contents of the Technical Report being checked.

3.2.2 Originator:

A. Compile a Technical Report review package consisting of the items identified below. Ensure that the document checked is marked as "Check Copy". Documents may be provided electronically (e.g., compact disk). Forward the review/check package to the Technical/QA Reviewer and Checker.

1. Draft technical report
2. Any pertinent background information, that is not readily available.
3. Review Record/Comment Sheets per OSTI-LLNL-QIP-6.1 (for Technical/QA Reviewer.)

3.2.3 Technical/QA Reviewer:

A. An independent Technical Reviewer shall conduct a technical content review in accordance with OSTI-LLNL-QIP-6.1. The Technical Review may be completed before Checking, or performed concurrently, as directed by the PM/DPM (or designee). The Technical Reviewer shall conduct an overall assessment of the technical quality of the document, including the document's technical adequacy, correctness, completeness, accuracy, applicability to the issues being addressed, and compliance with requirements provided in the governing procedure. The technical review criteria (Attachment 2) shall be used in the conduct of the review. Additional technical review criteria may be identified on the Review Record, as deemed appropriate by the PM/DPM (or designee).

B. The QA Reviewer shall conduct a QA content review in accordance with OSTI-LLNL-QIP-6.1. The QA Review may be performed concurrently with Checking or after Checking, as directed by the PM/DPM (or designee). The QA Reviewer shall ensure that quality requirements (e.g., compliance with governing procedural requirements, management directives, associated errata, condition reports, etc.) are adhered to. Additional QA review criteria may be identified on the Review Record, as deemed appropriate by the PM/DPM (or designee).

3.2.4 Checker:

A. Check the Technical Report for applicability, correctness, technical adequacy, completeness, accuracy, and compliance with established requirements.

B. Check that all data, models and information are clearly identified as direct or indirect input.

C. Check the Technical Report using the criteria in Section 3.1.2 and any additional product checklists, as appropriate.

D. Verify the solutions written using standard functions of commercial off the shelf software programs by visual inspection or hand calculation. Verify that portions of the report generated by OSTI-LLNL-QIP-SI.0 qualified applications, if used, meet the requirements stated in Section 3.1.2 D.

E. Clearly and legibly, write comments on the check copy. Comments may be documented separately if keyed to the check copy and comment documentation is attached to the check copy. If there are no comments, indicate such on the check copy.

F. Initial and date on the check copy, and return the check package (including comments) to the Originator.

3.2.5 Originator:

A. Resolve all comments with the Technical /QA Reviewer in accordance with OSTI-LLNL-QIP-6.1.

B. Resolve all comments with the Checker in accordance with this procedure. Document response next to each comment on the check copy or may be documented separately if keyed to the check copy and response documentation is attached to the check copy.

C. Elevate unresolved comments to the next level of management until resolution is achieved and document the resolution.

D. Modify the technical report, as required, to incorporate comment resolution.

E. Provide the modified Technical Report and associated documentation to the Technical /QA Reviewer and Checker.

3.2.6 Technical /QA Reviewer and Checker:

A. Review/Check the modified Technical Report to ensure incorporation of comment resolutions.

B. QA Reviewer review the modified Technical Report to verify that incorporation of the resolution of checker/technical reviewer comments does not violate QA requirements

C. Return the Technical Report review/check documentation to the Originator.

3.3 Product Output

3.3.1 Originator:

A. Submit the following key technical data to the Technical Data Coordinator for submittal to the TDMS in accordance with OSTI-LLNL-QIP-SIII.3.

1. Product output that replaces or supersedes product output or data that are currently in the TDMS.

2. Data that have undergone a status change, as a result of a qualification within the technical report.

3. Other output may be submitted, as directed by the PI.

B. Finalize or supersede preliminary product output, if any, in accordance with OSTI-LLNL-QIP-SIII.3.

3.4 Approval of Technical Reports

3.4.1 Originator:

A. Prepare the final Technical Report by changing the alphanumeric designator to a numeric designator (i.e., the initial Technical Report designator is "00," and subsequent revisions are "01," etc.) and updating the change history, as necessary.

B. Complete the Technical Report Signature Page/Change History (Attachment 3) by obtaining all required signatures.

C. Submit the approved Technical Report to the Records Coordinator in accordance with OSTI-LLNL-QIP-6.0.

D. Submit the Technical Report records package to the Records Coordinator for submittal to the Records Center (RC) in accordance with Section 4.0.

3.4.2 PM:

If the Technical Report is identified as a deliverable to DOE, prepare and submit appropriate documentation with a transmittal letter. Any changes to the Technical Report resulting from DOE review comments shall be completed in accordance with section 3.6.

3.5 Editorial Corrections

3.5.1 Originator:

A. If the Technical Report requires editorial corrections (that does not affect the technical content of the Technical Report) after approval but before controlled distribution, change the in-process master as follows:

1. Mark the change(s) by drawing a single line through the change(s) (i.e., pen/ink or electronic changes) and/or inserting the new or correct information.

2. Initial and date the change(s).

3. Note the change(s) in the Remarks section of the Technical Report Signature Page/Change History (Attachment 3, Block 12).

B. Obtain PM's approval.

3.6 Technical Report Revision, Change, or Cancellation

The **PM** (or designee) shall:

A. Determine whether the Technical Report will be modified as a revision or as an Interim Change Notice (ICN). Reviews and checks of ICNs are limited to the changes and the portions of the documentation affected by the changes.

B. Notify the Records Coordinator of the initiation of a revision or change to an existing document to ensure version control, in accordance with OSTI-LLNL-QIP-6.0.

C. Issue no more than five ICNs against a document revision.

D. Revisions to completed technical reports shall be originated, checked, reviewed, and approved in the same manner as the original technical reports. Revised areas on technical reports shall be clearly identified as follows:

1. A black vertical line in the margin of the page, and notes clearly indicating which individual sections or subsections were revised, as applicable, and a brief description of the revision or change in the Technical Report Signature Page/Change History (Attachment 3, Block 12).

2. A note in the Technical Report Signature Page/Change History (Attachment 3, Block 12) indicating the entire report was revised and the changes were too extensive to use vertical lines to identify revised sections.

E. Ensure revisions to technical reports include any outstanding Errata and required corrections in accordance with OSTI-LLNL-QIP-16.0, *Condition Reporting and Resolution*. List any errata addressed in the Remarks section of the Technical Report Signature Page/Change History (Attachment 3, Block 9).

F. Only those parts of the completed Technical Report that are affected by the revision need to be checked, although the entire original Technical Report shall be reviewed to determine the affected parts.

G. Reviews of changes will be limited to the scope of the change.

H. Notify the Records Coordinator of intention to cancel Technical Reports that are no longer relevant to the project in accordance with OSTI-LLNL-QIP-6.0.

3.7 Errors

Originator:

If an error is detected after controlled distribution of a Technical Report, document and process the errors in accordance with OSTI-LLNL-QIP-16.0 in the following manner:

A. Generate an Errata Sheet in accordance with OSTI-LLNL-QIP-16.0.

B. Submit the Errata Sheet to Records Coordinator in accordance with OSTI-LLNL-QIP-6.0.

4. RECORDS

The records listed in Sections 4.1 and 4.2 shall be collected and submitted to the Records Coordinator in accordance with OSTI-LLNL-QIP-17.0 as individual records or included in a records package, as specified.

4.1 QA Records

For a Technical Report subject to the requirements of the QAP:

Records Package:

All QA records generated by OSTI-LLNL-QIP-6.1
Check Copies
Approved Technical Report submitted per OSTI-LLNL-QIP-6.0

4.2 NON-QA Long-Term Records

Review Drafts.

For a Technical Report not subject to the requirements of the QAP:

Records Package:

All non-QA records generated by OSTI-LLNL-QIP-6.1
Check Copies
Approved Technical Report submitted per OSTI-LLNL-QIP-6.0

4.3 NON-QA Short-Term Records (three year or less retention)

Transmittal letter to DOE

5. RESPONSIBILITIES

5.1 The **PM** (or designee) is responsible for assigning the Technical Report Originator, overseeing the development, documentation, revision, change and approval of the Technical Reports and the final disposition of disputed review comments.

5.2 The **Deputy PM** (or designee) is responsible for appointing Checkers, Technical, and QA Reviewers for OSTI-LLNL Technical Reports on the basis of education, training and experience. The Deputy PM or designee is also responsible for assigning specific review criteria, as deemed appropriate.

5.3 The **Quality Assurance (QA) Manager** (or designee) is responsible for overseeing the preparation, change and approval of this procedure, and for providing assistance and guidance to staff members in the review process and for reviewing the Technical Report for compliance with applicable OSTI-LLNL QA Program requirements.

5.4 The document **Originator** (the first or lead author) is responsible for preparing a scientific document and overseeing persons who have made material contributions to the work and composition; for accepting professional responsibility for its contents; for completing the report and scheduling and coordinating the review process.

5.5 The **Checker** is responsible for performing checks for both technical issues and compliance with procedural controls. The technical checker assigned to check a part of a technical report shall have adequate education, training and experience to understand and evaluate the contents of the Technical Report being checked. A checker shall not have participated in the authorship of the portion of the document (e.g., chapter) under his or her check.

5.6 The **Technical Reviewer,** a technically competent individual, other than the Originator and from the same technical area as the Originator, is responsible for reviewing the technical report, providing written comments on the Comment Sheet or draft documentation, and evaluating and accepting Originator responses. Comments shall be returned to the Originator in a timely manner.

6. ACRONYMS AND DEFINITIONS

6.1 Acronyms

COTS	Commercial Off-the-Shelf Software
DI	Document Identifier
DOE	U.S. Department of Energy
DTN	Data Tracking Number
ICN	Interim Change Notice
LLNL	Lawrence Livermore National Laboratory
OCRWM	Office of Civilian Radioactive Waste Management
OSTI	Office of Science & Technology and International
PI	Principal Investigator
PM	Project Manager
QA	Quality Assurance
QAP	Quality Assurance Plan
QARD	Quality Assurance Requirements Description
QIP	Quality Implementing Procedure
RC	Records Center
TDMS	Technical Data Management System
TIC	Technical Information Center
TWP	Technical Work Plan
YMP	Yucca Mountain Project

6.2 Definitions

Concurrence Draft: A draft of a scientific document or data set that has been revised to incorporate comments generated by Reviewer(s), and that is considered by the document or data Originator to be ready for concurrence and approval.

Direct Input: Input that are used to develop of results or conclusions in the Technical or Model Report.

Editorial Corrections: Corrections made to a document such as correcting grammar, spelling, or obvious typographical errors; renumbering sections or attachments (as long as the renumbering does not affect the chronological sequence of work); modifying the title or number of the document (as long as the fundamental process is not changed); updating organizational titles (as long as responsibilities are not changed); or making other corrections or clarifications of intent that do not alter the results or the way a document is used.

Errata: An error, discrepancy or inconsistency in a document.

Indirect Input: Input that is used to provide additional information that is not used in the development of results or conclusions in the Technical or Model Report.

Input: A source of information or data that is used in the scientific investigation.

Governing Procedure: The document invoking implementation of a procedure.

Model: A model representation of a system, process, or phenomenon, along with any hypotheses required to describe the process or system or explain the phenomenon, often mathematically (QARD).

Scientific Investigation: Any observation, identification, description, experimental study, or analysis and explanation of natural phenomena. (QARD)

Technical Report: As it pertains to scientific investigation, a document that presents scientific information such as data, analyses, interpretations or conclusions. (QARD)

7. REFERENCES

Quality Assurance Requirements and Description, DOE/RW-0333P

OSTI-LLNL-QIP-2.2, *Planning for Science Activities*

OSTI-LLNL-QIP-5.0, *Preparing the Quality Assurance Plan and Quality/Technical Implementing Procedures*

OSTI-LLNL-QIP-6.0, *Document Control*

OSTI-LLNL-QIP-6.1, *Document Review*

OSTI-LLNL-QIP-16.0, *Condition Reporting and Resolution*

OSTI-LLNL-QIP-17.0, *Records Management*

OSTI-LLNL-QIP-SI.0, *Software Management*

OSTI-LLNL-QIP-SIII.0, *Scientific Notebooks*

OSTI-LLNL-QIP-SIII.3, *Submittal and Incorporation of Data to the Technical Data Management System*

OSTI-LLNL-QIP-SIII.4, *Qualification of Unqualified Data*

OSTI-LLNL-QIP-SV.0, *Management of OSTI-LLNL Electronic Data*

8. ATTACHMENTS

Attachment 1 – Technical Report Outline

Attachment 2 – Technical Report Review Criteria

Attachment 3 – Technical Report Signature Page/Change History

9. REVISION HISTORY

2/25/05 Revision 0, Modification 0

Initial Issue

10. APPROVALS

Preparer: L S Gouveia / Leigh Gouveia	Date: 2/25/05
Technical Reviewer: Qinhong Hu / QINHONG HU	Date: 2/25/05
QA Reviewer: Victor J Barish / VICTOR J. BARISH JR	Date: 2/25/05
Project Manager: David B. McCallen / DAVID B. McCALLEN	Date: 2/25/05

TECHNICAL REPORT OUTLINE

If any of the following sections are not applicable to a particular technical report, a brief statement of non-applicability is required for documentation purposes under each heading. Information presented in the Technical Report documentation shall be transparent and traceable.

1. **Purpose**–This section shall provide a statement of the purpose of the scientific tasks documented in the technical report, the scientific investigation limitations, and the scope of the scientific investigation documentation. It shall also refer to the TWP for the activity and discuss, as necessary, any deviations from that plan.

2. **QA**–This section shall include the applicability of the QA program, including evaluation of associated activities in accordance with appropriate implementing procedures. If scientific tasks included in the Technical Report activity have been determined not to be subject to the QAP, provide justification. Reference the TWP for the determination of the applicability of the QAP. If the analysis investigates an item or barrier on the Q-List, identify the item or barrier and its safety category as directed by the memorandum of "*Guidance and Funds to Lawrence Livermore National Laboratory for Tasks from the Office of Civilian Radioactive Waste Management.*" This section shall describe any variance from the planned method(s).

3. **Use of Software**–This section shall include a list of all controlled and baselined software as described in OSTI-LLNL-QIP-SI.0 or (if previously developed for the YMP) applicable YMP procedures. Document the use of the software, including the software name, tracking number, version, and operating environment (including platform and operating system).

   Include a list of any software that was used prior to qualification to develop a preliminary output. If the solution to the calculation or analysis package used to support the Technical Report is obtained using the standard functions of a commercial off-the-shelf software program (e.g., EXCEL, MATHCAD, or EARTHVISION) and the results are not dependent on the software program used, this software does not need to follow OSTI-LLNL-QIP-SI.0.

   If the results are not dependent on the software program, the actions performed (as indicated below) shall be documented in sufficient detail in the Technical Report to allow an independent reviewer to reproduce or verify the results by visual inspection or hand calculation without recourse to the Originator:

   The formula or algorithm used

   - A listing of the inputs to the formula or algorithm
   - A listing of the outputs from the formula or algorithm
   - Other information (e.g., operating environment information) that would be required in order for any independent person to reproduce the work.

4. **Inputs**–Technical product inputs shall be correctly selected, identified in the Technical Report documentation, correctly cited, and incorporated. Inputs include materials that support the conclusions of the technical report.

   4.1 Direct Inputs–The appropriateness of technical product inputs directly used to develop the Technical Report shall be documented in this section.

   - Provide lists or tables of inputs. Identify inputs by Data Tracking Number (DTN), Technical Information Center (TIC) number or other applicable document identifier and indicate the qualification status (i.e., qualified data, established fact, etc.)

   - If a previously developed and validated model is used list associated DTNs, accession numbers, documentation titles, and document identifying numbers, as applicable.

   4.2 Criteria– List criteria that the document must satisfy as stated in the TWP, including requirements contained in applicable DOE requirement documents and any relevant acceptance or completion criteria.

   4.3 Codes and Standards–Provide a list of the applicable codes (only if the report directly addresses federal or other code requirements) and standards (e.g., American Society for Testing and Materials or Occupational Safety and Health Administration standards) used in the Technical Report by name, number, and date, including applicable revision status, using date or revision designator.

5. **Assumptions**–This section shall include a description of the assumptions used, in the absence of direct confirming data or evidence, to perform the scientific investigation. Assumptions shall be clearly stated and the rationale for suitability of the use of the assumption shall be included.

6. **Scientific Approach**–Describe the technical bases, mathematical formulations, and numerical methods used.

   Provide (separate) lists or tables of corroborating and supporting data, models, or product output used. Identify the sources of the corroborating and supporting information. Document the qualification of unqualified data developed in accordance with OSTI-LLNL-SIII.4. Include additional discussions to substantiate input used in this section, if not included in Section 4. Address any differences in direct input values, between values brought forward in Section 4, and values used in this section.

   The following topics shall be included in this section, as applicable:

   - A detailed description of the scientific approach and/or technical methods

   - Results of literature searches or other background data and information

- A discussion of uncertainties, sources of uncertainties, and impacts of uncertainties on Technical Report output
- Units of measurement
- A discussion of idealizations, and simplifications, including their bases or rationale
- Alternate scientific approaches and/or technical methods that were not used and the rationale for not selecting them
- Intended use of the output
- Appropriateness of the use of a previously developed and validated model to complete the present Technical Report is described

7. **Conclusions**–This section shall provide a summary of the technical report. The conclusions, including product output, as well as any decisions or recommendations, shall be presented in this section. Conclusions shall include any uncertainties and restrictions for subsequent use.

8. **Inputs and References**–Sources of inputs, software, DTNs, and cited references (including references used to justify assumptions) shall be listed in this section. Inputs and references include materials that support the conclusions of the technical report. These may include published reports, technical papers, scientific notebooks, literature searches, or other background information. The OCRWM Style Manual may be used as guidance on formatting reference lists and citations.

Appendices–Supporting documentation, such as computer output, that are lengthy or cannot be conveniently included within the main text of the documentation may be included as appendices. Computer output may be attached as hard copy or read-only disk, but must meet the requirements of OSTI-LLNL-QIP-17.0. Computer output files included as appendices are exempt from page numbering, DI, and revision number requirements provided the total number of pages in each appendix (for hard copy) or complete file information including all file names, file dates and times, and file sizes are documented on the appendix. In case of printed appendices, the total page count for each appendix shall be documented on the Technical Report Signature Page/Change History (Attachment 3). Where the appendix is on computer media, the quantity and type of media shall be clearly identified on the Technical Report Signature Page/Change History (Attachment 3).

TECHNICAL REPORT REVIEW CRITERIA

1. Does the Technical Report present a clear introductory statement of the technical purpose, scope, and objectives?

2. Input Data:

   a) Are the input data adequately described in the technical report?
   b) Is this discussion sufficient to demonstrate that these data were used properly to perform the analysis?
   c) Does the Technical Report adequately document the use and interpretation of these data, including effects and consequences of data limitations?

3. Is the level of detail and manner of presentation, including tables and figures, sufficient to allow a technically qualified individual to understand the development of the technical arguments, the scientific and mathematical methods used, the conclusions reached, and the presentation of technical information and results without recourse to the Technical Report originator?

4. Are the technical arguments sound, appropriate and adequate to support the results and conclusions?

5. Are the technical assumptions identified? Are adequate bases for these assumptions provided?

6. Is there adequate discussion of the scientific and mathematical methods and model(s) that are used together with the rationale for the selection of these methods or model(s)?

7. Is there adequate discussion of alternative methods and approaches?

8. If a model is used, is the range of applicability, the limitations of the model, and model uncertainty and its consequences addressed adequately? Is the model appropriate and adequate for its intended purpose?

9. Does the Technical Report describe the limitations of the analysis and provide a technically adequate discussion of precision, accuracy, and representativeness of results?

Lawrence Livermore National Laboratory	**OSTI-LLNL** **TECHNICAL REPORT SIGNATURE PAGE/ CHANGE HISTORY**	1. Page of

2. Technical Report Title			
3. DI (Including Revision Number)			
4. Total Appendices		5. Number of Pages in Each Appendix	
	Printed Name	Signature	Date
6. Originator			
7. Checker			
8. Project Manager			
9. Remarks			

CHANGE HISTORY

10. Revision No.	11. Total pages	12. Description of Change

INSTRUCTIONS FOR COMPLETING THE TECHNICAL REPORT SIGNATURE PAGE/CHANGE HISTORY

Originator

1. Enter the total number of pages (excluding appendices).
2. Enter the title of the technical report.
3. Enter the DI, including the revision number, assigned to the technical report.
4. Indicate total number of appendices.
5. Indicate the number of pages in each appendix (e.g., A-11, B-5, and C-20) or if list is long, identify where a listing is provided.
6. Print name, sign, and date.

Checker

7. Print name, sign, and date.

Project Manager

8. Print name, sign, and date to signify approval.

Originator, Checker, Project Manager

9. Enter any pertinent remarks.

Originator

10. Identify any revisions or changes to this technical report, in order, starting with REV 00 and continuing to the latest revision/ICN.
11. Enter the total page count, including appendices and cover, for each revision/ICN.
12. For any revisions or ICNs to this technical report, enter a brief description of each change and the reason for the change (e.g., "added Appendices A and B").